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Lamellibranchs, 44 Scaphopods, 33 Pteropods, 1127 Gasteropods, and 2 Cephalopods; implying a total molluscan fauna of "at least eighteen hundred forms."

*STEARNS, R. E. C.—Notes and comments on the distribution of *Planorbis bicarinatus. West American Scientist*, VI., p. 110, 1889.

STERKI, V. A.—A Study of the American species of Vertigo contained in the U. S. Nat. Mus., with a description of a new sub-genus of Vertigo. Proc. Nat. Mus., XI., p. 369, 1888 [1889].—New sub-genus Angustula.

NEWLY-DISCOVERED GLACIAL PHENOMENA IN THE BEAVER VALLEY.

BY P. MAX FOSHAY AND R. R. HICE.

AT the mouth of Connoquenessing Creek the valley of the Big Beaver is typically developed. The hills on either side, rising to an elevation of 1200′ + A.T., slope rather gently down to the old base level plain, here at an elevation of 180′+ above the present river level, or 910′ + A.T. This plain marks the level of a system of preglacial drainage at this point, which, as has been heretofore suggested, was probably to the north. The plain is covered with a fine, close, and very tough whitish or yellowish clay, shading away at some points into a mixture of sand and gravel, the pebbles for the most part being well-rounded quartz, in size from one and one-half inches in diameter downward.

Near the middle of this old river valley is a gorge, 200 to 300 yards in width, cut almost perpendicularly into the heavy sandstones, the Homewood and lower members of the Conglomerate series, and reaching to a depth of 125′ + below the present level of the Beaver, having a total depth of 300′ +.

Two or three miles to the north occur great deposits of morainic material,[1] which were supposed to mark the southern limit of glacial action in the Beaver valley.

[1] H. C. Lewis and G. F. Wright, Second Geological Survey of Penna., Vol. Z, p. 194.

At the mouth of the Connoquenessing, and lying upon the old base level plain, are several deposits of stratified gravel, having irregular hummocks, forming in some places small but well-defined kettle-holes; in short, partaking of the characteristics of kames, and apparently overlying the whitish or yellowish clay above mentioned. Lying south of the terminal moraine as heretofore mapped, some doubt was at first raised as to their true character, a doubt since removed by a more careful examination of the largest of them, and the discovery of grooves and striæ on the cliffs of the rock-gorge.[2]

The largest of these deposits is of an "L" shape, with the longer arm lying in the direction of the river valley, and almost a mile in length. It reaches thirty to forty feet above the base level plain, and the top is formed into irregular hummocks, covered with a thin, gravelly soil. The only sections seen showed clear but irregular stratification, and we did not feel sure we saw the junction of the kame and underlying clay at any point. We were informed, however, that, after passing through the gravel, as much as eleven feet of hard, tenacious clay had been penetrated without reaching the rock.

This, the largest deposit, lies on the western side of the river, a little above the mouth of the Connoquenessing. There are other deposits, of essentially the same structure, a mile further south (just north of Clinton Run), and on the eastern side of the river one is seen on the old base level plain of the Connoquenessing, one-fourth mile from the Beaver.

On a close examination of the base of the largest kame, in the search for its junction with the underlying clay, a new feature of glacial action in the Beaver valley was discovered, in a number of grooves and striæ. On its eastern side the gravel reaches at one point to the bluff of the rock-gorge, and the massive rock having been quarried for building purposes, the surface of the sandstone was seen. The top of the gorge is here in the Homewood sandstone, at this point a massive, rather coarse-grained, quartz rock, slightly colored with iron. The quarry has been but little worked, and the grooves could not be followed for any distance on account of the overlying gravel. The direction of the face of the sandstone is S. S. W., and the grooves and striæ cut the face at an angle of about 60°, their direction being about S. E. by S., practically at right angles to the glacial border. The direction of the old valley is here nearly north and south, hence the grooves and striæ cut the valley at an angle of nearly 45°, and must have ended abruptly on the cliffs of the rock-gorge.

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[2] The nearest striæ reported are one-half mile northwest of New Castle. Second Geol. Survey of Penna., Vol. Z, p. 196.

The largest groove is about five feet in width and eighteen inches in depth, the entire surface being striated in the direction of the groove. The smaller grooves lie in the same direction, and the entire surface seen (some forty feet) is uniformly scratched. No indications of cross striation were seen on the rock in place, but on a loose fragment (4′ × 3′) left in quarrying some indications of cross striæ were visible.

Some ten or twelve rods to the south, in another quarry, striæ were also seen, running in the same direction; here they were visible for some fifteen feet. The sandstone at this point is a Conglomerate, the pebbles reaching three-eighths of an inch in diameter. Here the surface is filled with pot-holes, from one to five feet in diameter, and from one to two feet in depth. None were seen entire, all the exposed ones being more or less shattered in quarrying. The pot-holes are not in anywise striated, nor does the striating agent appear to have affected the edges of the holes, which are as sharp as those now forming in similar sandstones. The general appearance of the pot-holes indicates that they were made by a north-flowing stream, and we believe they are older than the striæ, though the evidence is as yet incomplete.

Beaver, Pa., July 29, 1890.